Mosquito regulatory peptides possibly involved in the regulation of diuresis and digestion.

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The insect midgut contains different types of endocrine cells which can be expected to regulate various aspects of digestion. I believe that the functional roles of these endocrine cells are probably more easily identified in a blood feeding insect, where large changes in the digestive system are induced by a blood meal. The mosquito *Aedes aegypti* is a particularly attractive model, since two important aspects of blood feeding, i.e. diuresis and the synthesis of trypsin after a blood meal, have been relatively well studied in this species. We have therefore characterized the endocrine cells of the midgut of the female *A. aegypti*. Four different cell types can be characterized by their immunocytological reaction. Cell type (1) reacts with antisera to RFamide, sulfakinin, bovine pancreatic polypeptide and FMRFamide. Cell type (2) reacts with an antiserum to urotensin 1. Cell type (3) reacts with antisera to α-neo-endorphin and locustatachykinin. Cell type (4) reacts with antisera to the allatostatins. Peptides which are likely responsible for these immunoreactivities have been isolated from *A. aegypti*. They include three *Aedes* allatostatins, two *Aedes* locustatachykinins, three *Aedes* head peptides (which have a C-terminal RFamide sequence), and one *Aedes* sulfakinin. The *Aedes* allatostatins and locustatachykinins are believed to be responsible for the locustatachykinin and allatostatin immunoreactive endocrine cells in the midgut. However, the identity of the RFamide-immunoreactive peptide(s) present in the midgut endocrine cells remains uncertain, since antisera to N-terminally extended RFamides are notorious for their cross-reactivity. The large amounts of *Aedes* head peptide isolated in comparison with the only small amounts of *Aedes* sulfakinin, suggests that the head peptides may be present in the midgut endocrine cells. This hypothesis is reinforced by the isolation of a novel head peptide as the major RFamide immunoreactive peptide in the midgut of the American cockroach.

The insect diuretic hormones, CRF and urotensin are related; the urotensin-immunoreactive endocrine cells in the mosquito midgut suggested, therefore, the presence of an insect CRF-like diuretic hormone in these cells. In midgut extracts we found diuretic hormone like activity, but the structure of the *Aedes* CRF-like diuretic hormone has not yet been established and the identity of both the diuretic factor and the urotensin-like immunoreactivity remains to be established. However, three members of the second insect diuretic peptide family, the leucokinins have been isolated from *A. aegypti*. The *Aedes* leucokinins are produced in neuroendocrine cells in the central nervous system and appear to be derived from a single precursor, since an *Aedes* preproleucokinin cDNA encodes all three leucokinins present in this species.

Source: https://www.industrydocuments.ucsf.edu/docs/xpcb0000